APPROVED CODE OF PRACTICE

OPERATIONAL PROVISIONS OF THE ROAD TRAFFIC (CARRIAGE OF DANGEROUS SUBSTANCES IN ROAD TANKERS AND TANK CONTAINERS) REGULATIONS 1992

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Notice of Approval

By virtue of section 16(1) of the Health and Safety at Work etc. Act 1974, after consultation in accordance with section 16(2) of that Act and with the consent of the Secretary of State for Transport, the Health and Safety Commission has on .... approved the Code of Practice for the Operational Provisions of the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992 (SI 1992 No ...).

The Code of Practice is approved for the purpose of providing practical guidance with respect to certain provisions of these Regulations. The approval of the Code of Practice by the Commission takes effect on ...

Signed

Secretary to the Health and Safety Commission

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INTRODUCTION

1. This Consultative Document contains proposals for an Approved Code of Practice (ACOP) on the operational provisions of the proposed Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992.

2. The ACOP is necessary to give practical guidance on the operational provisions of the proposed Regulations to consignors of dangerous substances and to the operators of vehicles carrying them.

3. Comments on the proposals should be sent by the date indicated on the cover of this document to:

Mr C N Cooper, Health and Safety Executive, SPD D3 (Room 414A), Baynards House, 1 Chepstow Place, London W2 4TF.

BACKGROUND

4. A revised set of Regulations has been proposed to replace the Dangerous Substances (Conveyance in Road Tankers and Tank Containers) Regulations 1981 mainly in order to overcome a variety of problems, to incorporate several exemptions and to allow a new procedure for the unloading of petrol at petrol filling stations.

5. In 1983 the Commission approved a Code of Practice on the operational provisions of the existing Road Tanker Regulations. This will automatically lapse when the Regulations are revoked by the new ones. Therefore a replacement Code will need to be approved to give similar guidance in respect of the new Regulations.

PROPOSED CODE

6. Since the proposed Regulations carry forward many of the requirements of the current Regulations, the proposed Code is largely derived from the existing ACOP.

7. It gives practical guidance on the methods of compliance with regulations 10, 12, 13, 14, 15 and 17 of the proposed Regulations. These regulations cover operational matters, including the information to be provided by consignors and how it is to be used by operators, the information in writing to be available during carriage, precautions against fire or explosion, prohibition against overfilling, and the supervision of vehicles. It also gives guidance in respect of the duties under sections 2(1), 2(2), 3(1), 3(2), 7 and 8 of the Health and Safety at Work etc. Act 1974 in relation to the loading and unloading of road tankers and tank containers and the compatibility of multi-loads.

8. However unlike the existing ACOP, it does not contain any advice on driver training in view of the proposed separate Driver Training Regulations which are expected to come into force on 1 July 1992.

9. Although it is intended primarily for the use of operators of road tankers, tank containers and vehicles carrying tank containers, it also contains advice for consignors of dangerous substances.

APPROVED CODE OF PRACTICE FOR THE OPERATIONAL PROVISIONS OF THE ROAD TRAFFIC (CARRIAGE OF DANGEROUS SUBSTANCES IN ROAD TANKERS AND TANK CONTAINERS) REGULATIONS 1992

PREFACE

This Approved Code of Practice has been prepared following discussions between representatives of the Confederation of British Industry, the Trades Union Congress, Local Authorities, Government Departments and the Health and Safety Executive.

The Code has been approved by the Health and Safety Commission, with the consent of the Secretary of State for Transport, under Section 16(1) of the Health and Safety at Work etc. Act 1974 for the purpose of providing practical guidance with respect to the provisions of the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992 (SI 1992 No) and on certain sections of the Health and Safety at Work etc. Act 1974 in so far as they relate to the carriage of a dangerous substance in a road tanker or tank container. Any reference in this Code to another document does not imply approval of that document by the Health and Safety Commission under Section 16(1) of the Health and Safety at Work etc. Act 1974, except to the extent necessary to give practical effect to this Code.

Although failure to comply with any provision of this Code is not in itself an offence, that failure may be taken by a Court in criminal proceedings as proof that a person has contravened a regulation to which the provision relates. In such a case however it will be open to that person to satisfy the Court that the regulation has been complied with in some other way.

Words and expressions which are defined in the Health and Safety at Work etc. Act 1974 or the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992 have the same meaning in this Code unless the context requires otherwise.

This Code gives practical guidance on the methods of compliance with regulations 10, 12, 13, 14, 15, and 17 of the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992. These regulations cover operational matters including information to be provided by the consignor and how it is to be used by the operator, information in writing to be available during carriage, precautions against fire or explosion, prohibition against overfilling, and the supervision of vehicles. It also gives guidance in respect of the duties imposed under Sections 2(1), 2(2), 3(1), 3(2), 7 and 8 of the Health and Safety at Work etc. Act 1974 in relation to loading and unloading of road tankers and tank containers and the compatibility of multi-loads. It is intended primarily for the use of operators of road tankers, tank containers and vehicles carrying tank containers. Each section of this Code which deals with the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992 gives practical guidance on a specific regulation, the number, title and content of which appear at the head of each section. The final two sections of this Code give practical guidance on compliance with certain sections of the Health and Safety at Work etc. Act 1974 in respect of the compatibility of multi-loads and the loading and unloading of dangerous substances.

Guidance on related aspects of legislation other than those listed in the preceding paragraph will be found in the following documents:-

1.	Health and Safety Series Booklets	(a)	A Guide to the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992 - HS(R)13(Rev.)	ISBN
2.	Approved Codes of Practice (ACOPs)	(b)	Classification and Labelling of Dangerous Substances for Carriage by Road in Tankers, Tank Containers and Packages (Rev. 2) (COP 19)	ISBN
		(c)	Road Tanker Testing: Examination, testing and certification of the carrying tanks of road tankers and of tank containers used for the carriage of dangerous substances by road	ISBN
		(d)	Transport of compressed gases in tube trailers and tube containers (COP 33)	ISBN
		(e)	Design and Construction of Vacuum-insulated Road Tankers used for the carriage of Non-Toxic, Deeply-Refrigerated Gases (COP ..)	ISBN

	(f)	Design and Construction of Vacuum-operated Road Tankers used for the carriage of Hazardous Wastes (COP ..)	ISBN
	(g)	Design and Construction of Road Tankers used for the carriage of Carbon Disulphide (COP ..)	ISBN
	(h)	Design and Construction of Vented, Non-Pressure Road Tankers used for the Carriage of Flammable Liquids - (COP ..)	ISBN
	(i)	Design and Construction of General Purpose Road Tankers used for the Carriage of Dangerous Substances - (COP ..)	ISBN
	(j)	Design and Construction of Road Tankers used for the Carriage of Liquefiable Gases (other than deeply refrigerated gases) (COP ..)	ISBN
3. Approved List	(k)	Road Tanker Approved List	ISBN
4. Guidance Note	(l)	Access to Road Tankers (Health and Safety Executive Guidance Note GS26)	ISBN

INFORMATION RELATING TO A DANGEROUS SUBSTANCE TO BE PROVIDED BY THE CONSIGNOR

Regulation 10

(1) The consignor of a dangerous substance shall ensure that each operator who is to carry it is provided with such information as will enable that operator -

(a) to comply with these Regulations insofar as they impose requirements or prohibitions on him; and

(b) to be aware of the risks created by the substance to the health or safety of any person.

(2) An operator shall not carry a dangerous substance unless he has been provided with the information referred to in paragraph (1).

(3) The consignor shall ensure that the information referred to in paragraph (1) is -

(a) so far as is reasonably practicable, provided in written form;

(b) accurate; and

(c) sufficient for the purposes for which it is required to be provided.

(4) The operator shall, where the information referred to in paragraph (1) is not provided by the consignor in written form -

(a) reduce it to written form himself; or

(b) ensure that it is entered in his computer by a competent person.

(5) The operator shall keep the information referred to in paragraph (1) for a period of at least two weeks after the completion of the relevant journey.

(6) The information referred to in paragraph (1) may only be entered in a computer in accordance with paragraph (4)(b) if it -

(a) is capable of being reproduced in written form when required;

(b) is secure from unauthorised interference; and

(c) can be authenticated only by the person entering it.

Content of the Information

1. *Before carrying a dangerous substance by road* an operator must obtain certain information about the substance from the consignor. For these Regulations, the consignor is the person who arranges for or causes a substance to be carried by road or to be delivered to another person or place. Both 'consignor' and 'operator' are defined in the Regulations. The information given has to be sufficient to allow the operator to display hazard warning panels and compartment labels on the vehicle which give all the information required by regulations 18, 19 and 20. The operator must also obtain sufficient information about the dangerous substance to ensure that there is no limitation on its carriage under regulation 11 and to comply with the obligations placed on the operator under regulations 6, 10, 12, 13, 14 and 15. The consignor, who is in the best position to provide such information, has a distinct duty to ensure that the information is provided. Normally, this would include the following information:-

(a) if the substance is in the Approved List(a), the name of the substance, its substance identification number, its emergency action code and its classification as given respectively in columns 1, 2, 3 and 4 of Part I of the Approved List;

(a) Approved substance identification numbers, emergency action codes and classifications for dangerous substances carried in road tankers and tank containers ('The Approved List') - (ISBN).

(b) if the substance is not listed in Part I of the Approved List, the chemical name or accepted common name or trade name of the substance and its characteristic properties so that it may be classified in accordance with Part I of Schedule 1 to the Regulations;

(c) in the case of all dangerous substances, a telephone number from where specialist advice concerning the dangers of the substance and the correct handling procedure can be obtained at all times while the substance is being carried. Some consignors cannot themselves provide such specialist advice, and, in such cases, will normally have standing arrangements to ensure that the operator is provided with a telephone number of someone from whom such advice can be obtained. This may mean using one of the firms or organisations prepared to provide such advice under contract. Whatever telephone number is provided, it must be one from which advice can be obtained at any time when the vehicle is on the road. This may mean having an answering machine connected to an office telephone outside of normal office hours which provides the caller with an alternative telephone number from which advice can be obtained. Paragraph 7 of Schedule 3 to the Regulations lays down the procedure which must be adopted if the alternative wordings "consult local depot" or "contact local depot" are to be used;

(d) in the case of all dangerous substances, the nature of the dangers to which the substance may give rise, the emergency action to be taken in the event of any accident and any safety equipment specific to the load which must be carried on the vehicle;

(e) in the case of all dangerous substances, information necessary for determining the type of tank to be used, eg compatibility of the substance with materials of construction, vapour pressure data, and information for determining the correct ullage to be allowed in a tank.

How information may be obtained

2. The information referred to in the above paragraph should be obtained *from the consignor in writing,* except where it is not physically possible to do this within the operational timescale. There may be circumstances in which

it can only be obtained verbally. *Where it is obtained verbally the operator should ensure* that the person providing the information is the consignor or some other person acting on the consignor's behalf and should then either reduce it to written form or ensure that it is recorded in the consignor's computer by an employee who is responsible for such administrative/operational procedures, in which case it should be capable of retrieval, when necessary, in a written form which can be authenticated by that person and will be secure from unauthorised interference. The operator should also retain the written information for at least two weeks after the relevant journey was completed. At times, a driver may be asked by a consignor to accept a load for which no prior arrangements have been made. If this happens, it is still the operator's responsibility to ensure that the vehicle is correctly labelled, the driver adequately informed and that information in writing is available. Drivers should therefore be instructed to get in touch with their depots before accepting such loads, no matter what information they have been given by the consignor. The information obtained in writing may, for example, be by means of letter, telex or transport emergency cards, eg Tremcards, published by *Conseil Europeen des Federations de l'Industrie Chimique (CEFIC),* the texts of which are available in the UK from the Chemical Industries Association Ltd, King's Buildings, Smith Square, London SW1P 3JJ (Tel No: 071 834 3399). It should be noted that Tremcards do not necessarily give all the information which might be required for compliance with all the provisions of these Regulations. For example, they do not give the information (concerning degrees of filling/filling ratios) required in connection with regulation 15.

Duty of the consignor

3. *By paragraph (3) of this regulation any person, be it the consignor or anyone acting on his behalf, providing information to the operator must ensure* that it is accurate and sufficient for the purposes of paragraph (1) of this regulation and, where it is reasonably practicable to do so, that that information is provided in writing. The consignor, if not the manufacturer or the original supplier of the substance, should ensure that the necessary information is obtained from the manufacturer, original supplier or other appropriate source.

INFORMATION IN WRITING TO BE AVAILABLE DURING CARRIAGE

Regulation 12

(1) The operator of a road tanker carrying a dangerous substance or of any other vehicle carrying a dangerous substance in a tank container shall have ensured that the driver of the vehicle concerned was given adequate information in writing about -

(a) the identity of the substance;
(b) the quantity to be carried; and
(c) the nature of the hazards created by the substance and the action to be taken in an emergency concerning it.

(2) The driver of a road tanker carrying a dangerous substance or of any other vehicle carrying a dangerous substance in a tank container shall ensure that the information in writing relating to that substance which was given to him in accordance with paragraph (1) is, subject to paragraphs (5) and (6) and regulation 27, kept in the cab of the vehicle and is readily available at all times while the substance is being carried.

(3) Where a dangerous substance has been carried in a road tanker or tank container and the carrying tank of that road tanker or that tank container and (where the carrying tank or tank container concerned is divided into compartments) all the compartments thereof have been emptied and cleaned or purged so that any of the substance or its vapour which remains is not sufficient to create a risk to the health or safety of any person, the driver of the road tanker or any other vehicle carrying the tank container shall ensure that the information in writing relating to that substance which was given to him in accordance with paragraph (1) and which he had to keep in the cab of the vehicle in accordance with paragraph (2) is, subject to paragraph (5), destroyed, removed from the relevant vehicle or placed in a securely closed container clearly marked to show that the information relates to no other substance which is being carried.

(4) The driver of a road tanker or of any other vehicle carrying a tank container shall, if that road tanker or tank container is not carrying a dangerous substance, ensure that any information in writing in his possession which was given to him in accordance with paragraph (1) is destroyed, removed from the vehicle or placed in the securely closed container referred to in paragraph 3.

(5) Nothing in paragraph (3) shall require the destruction, removal or placing in a securely closed container of information in writing given to a driver in accordance with paragraph (1) which relates to any dangerous substance which has been removed from a road tanker or tank container in the manner specified in the said paragraph (3) where that information in writing relates also to a dangerous substance which is being carried, and the nature of the hazards created by those dangerous substances is such that the action to be taken in an emergency concerning them is identical.

(6) Notwithstanding paragraph (2), where the tractor unit of any articulated vehicle carrying a dangerous substance is detached from the trailer of that vehicle on a road or in premises, the driver of the vehicle shall attach the information in writing relating to that substance which was given to him in accordance with paragraph (1) to the trailer in a readily visible position or (in the case where the tractor unit is detached as aforesaid in premises) give that information to the occupier of the premises; and in such a case, the occupier shall ensure that the said information is readily available at the premises.

(7) Notwithstanding paragraph (2), the driver of a road tanker carrying a dangerous substance or any other vehicle carrying a dangerous substance in a tank container shall, when so requested in an emergency by any police constable or any member of the fire or ambulance services, produce the information in writing relating to that substance which was given to him in accordance with paragraph (1) to that constable or other person.

Content of the information

4. *Regulation 12(1) places a duty on the operator* to ensure that the driver of a vehicle carrying a dangerous substance is furnished with information in writing appropriate to the load being carried, based upon information obtained by the operator under regulation 10. It should include the following:-

(a) the name of the substance;

(b) the nature of the dangers inherent in the dangerous substance being carried and the safety measures that need to be taken to avert them;

(c) the action to be taken and treatment to be given in the event of persons coming into contact with or being exposed to the substance being carried;

(d) the measures to be taken in the case of fire and, in particular, the fire-fighting equipment to be used;

(e) the measures to be taken should the dangerous substance be spilled; and

(f) instructions on when to use any special safety equipment provided for the specific load being carried, eg protective clothing, specific antidotes, etc.

How information is to be given

5. The information in writing should preferably be in the form of a Tremcard *(see paragraph 2)*. Where no Tremcard is available, the information should preferably be in the same format as a Tremcard. This information may be passed directly to the driver by the consignor by prior arrangement between the consignor and the operator.

Where to keep the information

6. *The operator should provide in the cab* of the vehicle a means whereby the driver may keep the information provided to him under paragraph (1) of this regulation. This could, for example, be a clipboard or a brightly coloured pouch mounted in the cab in a central position or some other means whereby the information is readily accessible and visible to the emergency services, should an accident occur.

7. *Regulation 12(2)(a) makes the driver totally responsible* for ensuring that the information in writing is carried in the cab of the vehicle throughout the carriage operation.

8. Regulation 12(2)(b) and regulation 12(3) between them make it an offence for the driver to display any information in writing relating to a dangerous substance when no dangerous substance is being carried. Regulation 12(2)(b) deals with the situation when the vehicle has carried a dangerous substance but no longer does. Regulation 12(3) deals with circumstances when the vehicle has not carried a dangerous substance previously. However, regulation 12(4) exempts written information (or multi-purpose Tremcards) covering more than one substance from the requirement to remove, destroy or lock away information that relates to substances not being carried, provided that the hazards are similar and the action to be taken in an emergency is common to all substances covered by the said written information (or Tremcard). Load-sheets and advice/consignment notes will also be exempt from this same requirement.

9. It may be necessary, as part of the normal transport operations, to detach a tractor unit from the tank trailer of an articulated vehicle at, for example, the place of loading or unloading or at a transport depot at an intermediate stage of the journey. In these circumstances it is essential that the information provided under regulation 12(1) is still available for the emergency services. It should be attached in some way to the trailer or otherwise be readily accessible on site, during the period in which the motive unit is detached. Regulation 12(5) caters for such a situation. Where it is attached to the trailer, the information should be easily visible to the emergency services and be protected from the weather. It should be noted that these requirements apply to a nominally empty tank if it has not been cleaned or purged so that any of the substance which remains is not sufficient to create a

risk to the health and safety of any person. Likewise, regulation 12(6), which is a new exception, allows a driver to hand over information in writing to a member of the emergency services during an emergency.

Information only to apply to substance(s) being carried

10. *Drivers have to ensure* that the information required by this regulation is readily available. Where necessary the operator should provide in the cab or elsewhere in the vehicle a receptacle which would remain securely closed in the event of an incident, including one involving roll-over, to enable the driver to fulfil the duties under paragraph 2(b) of this regulation so that information relating to substance(s) no longer being carried is not openly available. This receptacle should be clearly marked to indicate that any information contained in it does not relate to the load being carried. As any part of a load is unloaded from the vehicle, the driver should not place information concerning that particular substance in the receptacle referred to above unless the tank or compartment has been cleaned or purged. Such a receptacle would not normally be necessary in the case of a road tanker dedicated to the carriage of a single substance. However, if such a dedicated tanker was cleaned and purged, the information required by this regulation should then have to be removed.

11. It is quite common for operators to provide their drivers with handbooks concerning the carriage of dangerous substances, and often these contain information similar to that which would normally be provided under this regulation. It is not necessary, however, for such a document to be kept in the securely closed receptacle, provided that it is made quite clear on the cover of the handbook that it does not relate specifically to the substance(s) being carried.

PRECAUTIONS AGAINST FIRE OR EXPLOSION

Regulation 13

> *(1) The operator of a road tanker carrying a dangerous substance or of any other vehicle carrying a dangerous substance in a tank container shall provide that vehicle with adequate fire-fighting equipment.*

(2) Every driver of, and every person repairing, maintaining, examining, inspecting, loading, unloading or otherwise dealing with, a road tanker carrying a dangerous substance or any other vehicle carrying a dangerous substance in a tank container shall observe all the precautions necessary for preventing fire or explosion.

Scope and general duties

12. *This regulation lays a duty upon every person engaged in the carriage* by road of a dangerous substance and is thus not limited only to the operator or driver. All persons physically engaged in loading and unloading and all persons who may have contact with the vehicle are all bound by this regulation. The latter group would include such persons as a driver's mate, a fitter, a police officer or a customs officer, and not just those who are engaged in the carriage of the dangerous substance. Other persons less directly involved with the actual operations would also have duties under this regulation. For example, the manager responsible for the supervision of the driver and/or other persons controlling loading or unloading should, where appropriate, draw up written procedures for the safe conduct of the various operations and the precautions necessary for preventing fire or explosion. These procedures should be made known to the driver and/or, as appropriate, to the persons involved in loading or unloading.

13. Because these Regulations apply from the commencement of loading of a dangerous substance until the tank or compartment has been cleaned or purged, the requirements of this regulation include the precautions to be taken during both loading and unloading as well as while the vehicle is on its journey. The measures necessary to comply with this regulation will vary according to the nature of the substance in question and the circumstances of its carriage. While this regulation applies during the carriage of a dangerous substance, the precautions required are not limited to preventing fire or explosion associated directly with the load being carried. It is therefore necessary to take precautions against the incidence of fire or explosion from other sources which is likely to involve the vehicle or its load, eg engine, brake or tyre fires. It is also necessary for the driver to be equipped or adequately instructed to deal with a small spillage of the dangerous substance(s) being carried. The operator should therefore ensure that the vehicle is properly and regularly maintained in order to guard against such occurrences. As a further example, a portable cooking stove should not be used in the cab of the vehicle at any time

during the carriage of a dangerous substance. If flammable liquids or flammable gases are being carried and a cab heater, other than that operated from the vehicle's engine, is installed, it should be of a totally enclosed combustion type which is installed in such a way that it cannot be used when the engine is running. In addition, it should not be switched on during loading or unloading.

14. The types of substance most likely to give rise to a fire or explosion are:-

(a) flammable liquids and flammable gases;

(b) liquid oxygen, inherently unstable substances such as organic peroxides and other strongly oxidising substances;

(c) spontaneously combustible substances;

(d) substances which in contact with water are liable to become spontaneously combustible or to give off a flammable gas.

Examples of measures to be taken in respect of these substances are given in paragraphs 15-21.

Precautions relating to flammable substances

15. Special precautions should be taken when loading or unloading substances which give off a flammable vapour, especially when a purged tank is filled for the first time. For example, all devices which shield the dangerous substance from sources of ignition, eg flame traps, or which prevent the accumulation of static electricity, eg earthing connections, should be in position and in working order both before and during the loading and unloading processes. Filling or emptying should be stopped if a fire occurs in the close vicinity, which would be likely to ignite any vapours which might escape from the filling or emptying operation, or if there is an electrical storm overhead. Loading or unloading should be carried out in a place where appropriate fire-fighting equipment is readily available. Where the engine of a vehicle drives a discharge pump, and where there is a likelihood of significant flammable vapour being present in the atmosphere from, say, the breaking of pipe connections, the engine should not be started up until all connections have been made and should

be stopped before any connections are broken. In this context it should be noted that paragraph 12 of Part II of Schedule 4 to the Regulations prohibits the running of the vehicle engine or any other engine or motor attached to the vehicle during the unloading of petrol intended to be used as a motor fuel at prescribed premises.

Sources of ignition

16. Because leakages are more likely to occur during loading or unloading, all potential sources of ignition should be removed from the close vicinity of the vehicle and from the vehicle itself, during loading and unloading of liquid oxygen or of a substance likely to give off a flammable vapour. Only persons directly and necessarily involved in the operations should be permitted to approach the vehicle. It should be ensured that such persons introduce no sources of ignition into this area.

Smoking

17. Persons directly engaged in the loading or unloading of a substance which could give off a flammable gas or vapour, or of liquid oxygen, should not smoke while these operations are taking place. It should also be ensured that other persons who come into the close vicinity of such operations do not smoke. Where there is a possibility of a flammable gas or vapour being present in the cab of the vehicle, for example, during the carriage of petrol used as motor fuel where there is a possibility of clothing being soaked by the dangerous substance, the operator should ensure that the driver, and any mate, does not smoke in the cab and does not carry any matches or lighters.

Fire extinguishers

18. When dangerous substances which pose a risk of fire or explosion are carried, adequate fire-fighting appliances should be provided. The type and size of extinguishers that should be provided will obviously depend on the nature of the load; if necessary expert advice should be sought. All fire extinguishers provided on the vehicle should be maintained in an efficient working order and in a good state of repair. BS 5306: Part 3 gives advice on inspection and periodic maintenance. Any extinguishers sited on the body of the vehicle should be protected from the weather.

19. As an example of what is adequate, road tankers carrying petrol should be provided with a minimum of two extinguishers. One should be provided in the cab with a minimum test fire rating of 21B (BS 5423) such as 1 kg of dry powder which could be used as a first defence against a fire in the engine compartment. One or more additional extinguishers with a minimum test fire rating of 144B (BS 5423) such as 9 kg of dry powder or 20 litres of foam should be provided on the vehicle itself to deal with a minor fire caused by the ignition of a small spillage of the load or possibly with a tyre fire. It should be noted, however, that these types of extinguisher are unlikely to extinguish a tyre fire although they may contain it until the emergency services can attend.

Precautions relating to organic peroxides

20. When organic peroxides requiring refrigeration are carried, regular checks should be made on the temperature of the load to ensure that it is kept within the limits laid down in the Approved List.

Precautions relating to spontaneously combustible substances

21. Adequate precautions should be taken in the case of a spontaneously combustible substance to maintain a layer of inert gas or liquid, as appropriate, above the substance to avoid contact between the substance and air. In the case of a substance which in contact with water emits a flammable gas, adequate precautions should be taken to avoid contact between the substance and water.

Repairs to vehicles

22. Whilst it will be normal for tanks to be purged and gas freed before major repairs are carried out, there may be occasions when minor repairs are carried out on vehicles where the tank still contains, say, a small quantity of flammable liquid or flammable vapour. In these circumstances this regulation will still apply and due precautions should be taken to prevent fire or explosion, eg work involving the application of heat or flame should not be carried out on the tank or in its vicinity.

PRECAUTIONS TO BE TAKEN BEFORE LOADING ROAD TANKERS AND TANK CONTAINERS WITH DANGEROUS SUBSTANCES

Regulation 14

> *The operator of a road tanker or tank container which is to be loaded with a dangerous substance shall ensure that that dangerous substance will not, in conjunction with any product remaining in the road tanker or tank container concerned, significantly increase the existing risk to the health or safety of any person arising out of the presence of that remaining product.*

23. *This new requirement places a duty on the operator* to ensure that the substance to be loaded into a tank will not react with any substance which may be left in the tank from a previous load, with the possible consequence of an even more hazardous situation, eg the production of a toxic gas or the over-pressurisation of the tank.

PROHIBITION AGAINST OVERFILLING ROAD TANKERS OR TANK CONTAINERS

Regulation 15

> *The operator of a road tanker or a tank container shall ensure that no tank or compartment in the road tanker or tank container concerned is overfilled with any dangerous substance.*

24. The main purpose of this regulation is to ensure that the tank does not become over-full due to expansion of the liquid or that it does not become over-pressurised such that there is a risk of the tank failing and the contents escaping, possibly in a catastrophic manner. Adequate ullage should therefore be allowed to cater for any expansion of the contents of the tank due to an increase in its temperature where the atmospheric temperature is, or is likely to become, higher than the contents temperature at the time of filling.

25. *This regulation places a specific duty on the operator of the road tanker or tank container to ensure that the tank is not overfilled.* In most circumstances the operator of a road tanker or tank container will not be present at the time the tank is filled and will therefore have to make adequate arrangements for the driver and/or other competent persons to carry out the

necessary checks. In the case of a tank container where the operator is, by regulation 5(2)(a), the owner of the tank container or the agent of the owner, then the operator or agent must ensure that the tank container has not been overfilled before it is taken on to a road to which the public has access. In the case of imported tank containers, the provision of a certificate by the consignor stating that the tank container has been filled in accordance with the requirements of the IMDG Code should suffice.

26. In determining whether a tank has been overfilled, account should be taken of any plate fixed to the vehicle or tank and accompanying documents and of any other indications of the maximum capacity of a tank or compartment, eg on a dipstick or on the filling aperture. Another means of checking may be by weighing the road tanker or the tank container, provided that there is a weighbridge in close proximity to the point of filling. In the case of liquefied gases, reference should be made to BS 5355 *"Filling Ratios and Developed Pressures for Liquefiable and Permanent Gases"* which gives details of filling ratios, ie the ratio of mass of gas to the mass of water which fills the tank, which will ensure that a tank is not overfilled. In the case of liquids, reference may be made to the technical provisions of the European Agreement concerning the international carriage of dangerous goods by road (ADR), or of the IMDG Code, which give details of acceptable degrees of filling.

SUPERVISION OF VEHICLES CONTAINING DANGEROUS SUBSTANCES

Regulation 17

> *(1) The driver of a road tanker or of any other vehicle carrying a tank container shall (when this paragraph applies) ensure that the vehicle concerned is parked in a safe place when it is not being driven, except -*
>
> *(a) when supervised at all times by him or by a competent person over the age of 18 years; or*
>
> *(b) in circumstances where no such competent person is present, when the vehicle has been damaged or has broken down on a road and the driver has left the vehicle to seek assistance.*

(2) Paragraph (1) shall apply where the road tanker or tank container is required by these Regulations to display hazard warning panels and the emergency action code (if any) required to be shown on those panels pursuant to Schedule 3 ends with the letter "E", except that that paragraph shall not apply where -

(a) any tank or compartment of a tank which formerly contained a substance which has an emergency action code ending with the letter "E" is nominally empty;

(b) in a case where the substance identification number 1270 is displayed on the hazard warning panels concerned, no petrol is being carried or any tank or compartment of a tank which formerly contained petrol is nominally empty; or

(c) in the case where the substance identification number 1268 is displayed on those hazard warning panels, no toluene or petroleum distillate having a flash point of less than 21°C is being carried or any tank or compartment of a tank which formerly contained any such substance is nominally empty;

and in this paragraph "nominally empty" means, in relation to a tank or compartment of a tank, that as much of the dangerous substance which it contained as it was reasonably practicable to discharge from it has been so discharged.

Parking in a safe place (regulation 17(1)(a)

27. To achieve the requirements for parking in a safe place, whilst at the same time satisfying other operational requirements, drivers should give careful consideration to the place in which they park their vehicles when they propose to leave them unattended away from their home base. For overnight stops of periods in excess of one hour the first choice should be a lorry park approved by a local authority specifically for vehicles carrying dangerous substances, or some other safe place which is in the open air but with no access for members of the public. Such a place could be a factory or a transport depot by prior arrangement with the occupier of that factory or depot. In such circumstances it would be necessary for the driver to be advised by the occupier of such a factory or depot as to where in that factory or depot the vehicle should be

parked. Wherever the vehicle is parked, it should be so parked that it can easily be moved in an emergency. Vehicles carrying substances requiring different hazard warning signs (*see Schedule 1 to the Regulations*) should, where practicable, not be parked adjacent to each other unless one or both of them are nominally empty.

28. Where it is possible to do so, the driver or the operator should make prior arrangements so that the driver can park in accordance with paragraph 27. However, should this not be possible, the vehicle should be parked at some other place which is -

(a) not a road;

(b) not within 15 metres of premises which are occupied; and

(c) not a place where the public usually pass or gather.

Reference to a road in (a) does not include the lorry parking area of a motorway service area or a disused loop of road used as a lay-by where it may be possible to park provided (b) and (c) are complied with. A further example would be the parking area of certain places of accommodation provided the area was private property away from the road and not within 15 metres of occupied premises. If a driver is in doubt regarding a safe place to park, advice should be sought from the local police.

29. Whenever a road tanker or vehicle carrying a tank container is parked in accordance with paragraphs 27-28, the motive unit should not be detached from a semi-trailer or drawbar trailer except where it is necessary for operational reasons (*see para 9*). This is so that the trailer can be quickly and easily moved in an emergency. In the case of a mechanical breakdown on the highway, the motive unit should not be detached from a semi-trailer or drawbar trailer until a replacement is available, except in certain emergency situations, eg if there was a fire in the motive unit.

Supervision of Vehicle (regulation 17(1)(a)

30. Where drivers wish to park their vehicles in order to have a meal, or to go to the toilet or whilst seeking access to premises in order to make a delivery, they may not be able to park in accordance with the requirements of

paragraphs 27-28. In these circumstances they should park in such a place that, so far as practicable, they can keep the vehicles in sight and remain sufficiently close to enable them to return to their vehicles within a few minutes. If they cannot park the vehicle in accordance with these requirements, they should seek the help of some other competent person over the age of 18 years, such as a supervisor at a delivery site, who will remain in sight of the vehicle and be in a position to get to it within a few minutes. A competent person would be considered to be someone who understands the nature of the danger to which the substance being carried may give rise and the emergency action which should be taken.

31. In the event of a breakdown of the vehicle or of a leakage or some other incident involving the dangerous substance, it may be necessary to call a breakdown service or the emergency services. In such circumstances the driver should stay with the vehicle, where it is safe to do so, and so warn other persons to keep clear and be on hand when the breakdown or emergency services arrive. In order to call the breakdown or emergency services, the driver should seek the help of other persons in the vicinity and request them to call the relevant service. By regulation 17(1)(b), these requirements do not apply in the event of the road tanker or vehicle carrying a tank container breaking down in an isolated part of the country with little passing traffic and the driver leaving the vehicle to seek assistance.

Security of vehicle during parking

32. Except where the vehicle is parked in secure premises or a compound, the driver should render the load as secure as is reasonably practicable against theft and interference before leaving the vehicle.

COMPATIBILITY OF MULTI-LOADS

HSW Act 1974 (sections 2(1), 2(2), 3(1) and 3(2)

> *2(1) It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees.*

2(2) Without prejudice to the generality of an employer's duty under the preceding sub-section, the matters to which that duty extends include in particular -

(a) the provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health;

(b) arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;

(c) the provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of his employees;

(d) so far as is reasonably practicable as regards any place of work under the employer's control, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks;

(e) the provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work.

3(1) It shall be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected thereby are not thereby exposed to risks to their health or safety.

3(2) It shall be the duty of every self-employed person to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that he and other persons (not being his employees) who may be affected thereby are not thereby exposed to risks to their health or safety.

33. Although the Regulations do not specify any requirements, other than those dealing with labelling, in connection with multi-loads, an operator has general duties under the HSW Act and this section of the Code deals with these duties. It should be noted that, whereas the duties under the Regulations are absolute, those under the 1974 Act are only "so far as is reasonably practicable".

34. This section of the Code is concerned with those multi-loads which comprise two or more substances where at least one is a dangerous substance. In regulation 2(1) a multi-load is defined as "a load consisting of two or more dangerous substances in separate compartments or tanks (whether or not a substance which is not a dangerous substance is being carried at the same time)", but that definition only has relevance to the labelling requirements of regulation 20.

Criteria to be used

35. In order that an operator can discharge the relevant duties as an employer or self-employed person under the HSW Act, it is necessary, inter alia, to know whether or not two or more substances, including substances which are not dangerous substances, may be carried as a multi-load. The criterion which should be observed is whether such a multi-load might, in the event of leakage, fire or other accident, give rise to a hazard which is greater than that belonging to the substances separately. If such a multi-load might have this effect, the relevant substances should be regarded as incompatible and should not be carried as a multi-load. The compatibility of multi-loads also has relevance to the requirements of regulations 10(1)(b) and 13.

36. The person primarily responsible for ensuring that multi-loads do not comprise two or more incompatible substances is the operator, but, where all the substances are provided by one consignor, then that consignor, in the capacity of employer or self-employed person, must share the responsibility.

37. Expert advice should always be sought about the compatibility of substances in a multi-load from, for example, the manufacturers of the substances, but the following examples of incompatibilities should be borne in mind -

(a) reactive oxidising substances *should not* be loaded with oxidisable substances;

(b) acids *should not* be loaded with alkalis; and

(c) substances such as cyanides liable to release toxic gases *should not* be loaded with acids.

Where to obtain information

38. The Appendix to this Code should be used as a guide to the question of compatibility. This Appendix reproduces a document published by the US Coast Guard and appears with their permission. This document was devised for substances carried in bulk in marine tankers, and is helpful in respect of the carriage of the same substances in road tankers and tank containers.

39. Substances are grouped by chemical structure similarity, and an indication of the compatibility of these groups is given. Additionally, the Appendix gives specific guidance on a number of substances which react differently, and therefore have different compatibilities, from other substances in the same group.

40. Substances shown to be incompatible in the Appendix should not be carried as a multi-load. However, because the compatibility chart in the Appendix is based upon groups of substances, it is possible that two individual substances may be compatible even though the combination of their respective groups indicates otherwise. In these circumstances, the two substances may be carried as a multi-load, provided that expert advice has indicated that they are compatible. Substances not named in the alphabetical listing of substances in the Appendix should not be carried as multi-loads until they have been considered in the light of expert knowledge, and of any uncharacteristic properties of the individual substances. Experimental work may be necessary before any new combination of dangerous substances is permitted.

41. A number of substances including the examples given below are not included in the compatibility chart in the Appendix because of their high reactivity. Such substances should not be carried as a multi-load in a road tanker or tank container. They include chlorine, chloro-sulphonic acid, ethylene oxide, motor fuel anti-knock compounds containing lead alkyls, nitric acid (over 70%), sulphuric acid fuming, phosphorus, sulphur (molten) and organic peroxides.

Criteria other than chemical compatibility

42. In addition to the question of chemical compatibility there may be other reasons why two or more substances should not be carried together. For example, petrol and oils used for heating purposes should not be carried as a multi-load because of the possibility of petrol being inadvertently delivered into a heating oil storage tank and the consequential hazard if such a mixture was used in a central heating boiler. Article 7 of Directive 78/319/EEC requires that toxic and dangerous waste is kept separate from other matter when being transported. Hazardous wastes should not therefore be carried as part of a multi-load with other substances.

LOADING AND UNLOADING OF DANGEROUS SUBSTANCES

HSW Act 1974 (sections 2(1), 2(2), 3(1), 3(2), 7 and 8

> *2(1) It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees.*
>
> *2(2) Without prejudice to the generality of an employer's duty under the preceding sub-section, the matters to which that duty extends include in particular -*
>
> > *(a) the provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health;1*

(b) arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;

(c) the provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of his employees;

(d) so far as is reasonably practicable as regards any place of work under the employer's control, the maintenance of it in a condition that is safe and without risks to health and the provision an maintenance of means of access to and egress from it that are safe and without such risks;

(e) the provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work.

3(1) It shall be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected thereby are not thereby exposed to risks to their health or safety.

3(2) It shall be the duty of every self-employed person to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that he and other persons (not being his employees) who may be affected thereby are not thereby exposed to risks to their health or safety.

7 It shall be the duty of every employee while at work -

(a) to take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions at work; and

(b) *as regards any duty or requirement imposed on his employer or any other person by or under any of the relevant statutory provisions, to co-operate with him so far as is necessary to enable that duty or requirement to be performed or complied with.*

8 *No person shall intentionally or recklessly interfere with or misuse anything provided in the interests of health, safety or welfare in pursuance of any of the relevant statutory provisions.*

43. By regulation 3(2) of the Road Traffic (Carriage of Dangerous Substances in Road Tankers and Tank Containers) Regulations 1992, carriage includes the operations of loading and unloading the contents of a road tanker or tank container, in those cases where the tank container remains attached to the vehicle.

44. This Code has already dealt with certain aspects of loading and unloading, namely, precautions against fire and explosion and against the overfilling of tanks in respect of the provisions laid down in regulations 13 and 15, but this section of the Code deals with the other precautions which should be taken in order to discharge the duties under the HSW Act listed above.

45. This section of the Code provides general guidance on loading and unloading operations which is applicable in most situations. The practices involved in the loading and unloading of dangerous substances vary considerably between different industries, eg the petroleum industry, the liquefied gas industry and the chemical industry, and even between different premises in the same industry, and it is not therefore possible to give detailed guidance in this Code.

Written Procedures

46. The occupiers of premises, other than private households or other premises where driver-controlled deliveries are made, where road tankers or tank containers are loaded or unloaded should, in their capacity as employers or self-employed persons, draw up written procedures for such operations and they should ensure that all persons in their employ who are engaged in such operations are aware of, and are trained in, these procedures. Where the driver of the vehicle is to be involved in these operations the driver should be made

fully aware of what is required before such operations commence. The operator should also, in the capacity of employer or a self-employed person, draw up written procedures in respect of such operations as are to be carried out by the driver, and the occupier should be made aware of these. Where necessary, the occupier or the operator should seek expert advice in drawing up the procedures.

47. In certain circumstances the driver is, by arrangement, totally responsible for the unloading operations eg at private households and at certain premises where liquefied gases are delivered. In these cases the operator, as the employer or self-employed person, should draw up the written procedures and the occupier should take such steps as are necessary to become acquainted with them. The occupier should also ensure that any persons in the occupier's employ who may be affected by the unloading are aware that such unloading is to take place.

Positioning of Vehicles

48. The vehicle should be prevented from moving accidentally during the loading or unloading operation. Suitable arrangements should be made to ensure that the vehicle is not driven away before these operations are finished. Wherever possible, the vehicle should be positioned so that it can be moved easily in an emergency. Preferably, filling or emptying of road tankers or tank containers should be done in the open air, in a well ventilated position with good visibility. This is especially necessary where flammable or toxic liquids or gases are concerned. In the case of, say, corrosive substances, it may be appropriate for loading or unloading to take place in a building or other enclosed space, in which case suitable collection facilities should be provided for any spillages.

Supervision of Loading and Unloading

49. The occupier, or the operator of the vehicle in the case of unloading at a private household or other premises where driver-controlled deliveries are made, should ensure that loading and unloading operations are supervised by a competent person over 18 years of age, ie a person who understands the nature of the dangers to which the substances being loaded or unloaded may give rise and the emergency action which should be taken. If it is necessary to discontinue loading or unloading, no filling or emptying pipe should be left connected

without someone in attendance. In an emergency, such as uncontrolled leakage of dangerous substances, loading or unloading should be stopped immediately by the competent person. This paragraph does not apply in those cases where a semi-trailer or drawbar trailer has been detached from the motive unit and is being used as a temporary static storage vessel.

Checking of Equipment

50. Before loading or unloading commences the occupier, or the operator of the vehicle in the case of unloading at a private household or other premises where driver-controlled deliveries are made, should ensure that the competent person checks that all connections have been properly made and that, as far as possible, all flexible hoses are sound and in good working order. The competent person should also check that all the appropriate safety equipment is used, eg protective clothing, breathing apparatus, or is available for use, eg fire extinguishers, eye wash bottles, showers.

Purging of Tanks

51. Where a road tanker or tank container is to be cleaned or purged of a dangerous substance, this should preferably be carried out in a place separate from the loading or unloading area. However, in certain circumstances it may be necessary to carry out this process in the loading or unloading area, eg in the case of toxic gases, where it is essential that they be purged back into the proper system in which they are manufactured and handled. Vapours from dangerous substances may need to be purged through a suitable treatment facility or dispersed safely in a well ventilated area, having regard not only to employees but also to the public. Where purging is carried out using an inert gas, care should be taken not to exceed the maximum working pressure of the tank. For those premises registered under the Alkali &c. Works Regulation Act 1906 as amended by the Health and Safety (Emissions into the Atmosphere) Regulations 1983, reference should be made to HM Inspectorate of Pollution (HMIP). Where washing or cleaning of tanks is to be carried out, safe disposal facilities for liquid and solid residues should be provided. Appropriate protective clothing and, where necessary, breathing apparatus should be worn during these operations. When the cleaning or purging is complete, where appropriate, its atmosphere should be checked to ensure that any remaining substance or vapour is no longer sufficient to create a risk to the health and

safety of any person. Should it be necessary to enter the tank, reference should first be made to the HSE Guidance Note GS5 *"Entry into confined spaces"* obtainable from HM Stationery Office (ISBN 0 11 883067 8, price £2.50).

Appendix

Bulk chemicals compatibility guide

Part 1 Explanation of tables and chart

The following information is extracted from Title 46 of the United States Code of Federal Regulations, Part 150. This was formerly the United States Coast Guard publication *Navigation and Vessel Inspection Circular No 475*. That Code contains further details of the test method used to determine compatibility, and the segregation rules developed from the information for use in bulk marine movements.

It is published in this Approved Code of Practice, by kind permission of the United States Coast Guard, as a guide to determine compatibility of substances for bulk road movements.

Using the guide

The following procedure explains how the guide should be used to find compatibility information.

1 Determine the group numbers of the two chemicals by referring to the alphabetical listing of products and their corresponding groups in Part 2. Many chemicals are listed under their parent names and, unless otherwise indicated, isomers or mixtures of isomers for a particular product are assigned to the same group. For example, to find the group number for isobutyl alcohol, look under the parent name butanols. Similarly, the group number for para-xylene is found under the entry xylene.

2 If both group numbers are between 30 and 43 inclusive, the products are compatible and the chart need not be used.

3 If both group numbers do not fall between 30 and 43 inclusive, locate on the chart (see Part 3) one of the numbers on the left (Cargo groups) and the other across the top (Reactive groups). Note that if one of the group numbers is between 30 and 43 it must be located on the left side. Proceed across the page until the appropriate reactive group column is intersected. The box formed by the intersection will indicate one of the following:

(a) blank — the two products are considered compatible.
(b) 'x' — the two products are not considered compatible.
(c) a letter other than an 'x' — differences (deviations) in reactivity are present among the group members — refer to the listing in Part 4 to find whether the products in question are included in the deviations. Unless the combination is specifically covered in that Part, it may be considered compatible.

Examples:

Combination	*Groups*	*Compatible?*
Butyraldehyde/acetic acid	19/4	yes
Allyl alcohol/toluene diisocyanate	15/12	no
Decene/ethyl benzene	30/32	yes
Ethanolamine/acetone	8/18	yes
Ammonia/dimethylformamide	6/10	no

Part 2 Alphabetical listing of substances

Name	*Group No*
Acetaldehyde	19
Acetic acid	4
Acetic anhydride	11
Acetone	18
Acetophenone	18
Acetyl tributyl citrate	34
Acrolein (inhibited)	19
Acrylamide solution (50% or less)	10
Acrylic acid (inhibited)	4
Acrylonitrile (inhibited)	15
Adiponitrile	37
Alcohols (mixed)	20
Alkyl phthalates (n-)	34
Allyl alcohol	15
Allyl chloride	15
2- (2-Aminoethoxy) ethanol	8
Aminoethylethanolamine	8
Ammonia, anhydrous	6
Ammonium hydroxide (28% or less)	6
Ammonium hydroxide, ammonium phosphate, molasses and water mixture	6
Ammonium nitrate, urea, water solutions (containing ammonia)	6
Ammonium nitrate, urea, water solutions (not containing ammonia)	43
Ammonium polyphosphate	43
Ammonium sulphate solution (20% or less)	43
Amyl acetate	34
Amyl alcohol	20
n-Amylene	30
n-Amylene/miscellaneous hydrocarbon mixture	30
Amyl tallate	34
Aniline	9
Asphalt	33
Behenyl alcohol	20
Benzene	32
Benzene, toluene, xylene (crude)	32
Butadiene (inhibited)	30
Butane	31
Butanols	20
Butyl acrylate (inhibited)	14
Butyl acetate	34
Butylamine	7
Butyl benzyl phthalate	34
Butylene	30
1,3 – Butylene glycol	20
Butylene oxide	16
Butyl methacrylate (inhibited)	14
Butyl methacrylate, decyl methacrylate, cetyl eicosyl methacrylate mixture	14
Butyraldehyde	19
Butyric acid	4
Calcium bromide solution	43
Calcium chloride solutions	43
Camphor oil (light)	18
Caprolactam solution	22
Carbolic oil	21
Carbon black base	33

Name	*Group No*
Carbon disulphide	38
Carbon tetrachloride	36
Cashew nut shell oil (untreated)	4
Chlorine	*
Chlorobenzene	36
Chlorodifluoromethane	36
Chloroform	36
2- Chloronitrobenzene	42
Chlorosulphonic acid	*
Chlorotoluene (m-, o-, p-)	36
Choline chloride solutions	20
Corn syrup	43
Creosote, coal tar	21
Cresols	21
Cresylate spent caustic solution	5
Cresylic acid	21
Crotonaldehyde	19
Cycloaliphatic resins	31
Cyclohexane	31
Cyclohexanol	20
Cyclohexanone	18
Cyclohexylamine	7
Cyclopentadiene polymers	30
Cyclopentadiene, styrene, benzene mixture	30
Cymene	32
Decaldehyde	19
Decane	31
Decene	30
Decyl alcohol	20
Decyl acrylate (inhibited)	14
Decylbenzene	32
Dextrose solution	43
Diacetone alcohol	20
Diammonium salt of zinc ethylene diamine tetraacetic acid solution	43
Dibutylamine	7
Dibutyl ethers	41
Dibutyl phthalate	34
Dichlorobenzene	36
Dichlorodifluoromethane	36
1.1 – Dichloroethane	36
Dichloroethyl ether	41
Dichloroisopropyl ether	36
Dichloromethane	36
2,4 – Dichlorophenol	21
1,1 – Dichloropropane	36
Dichloropropane/1,3 – dichloropropene mixture	15
1,3 – Dichloropropene	15
2,2 – Dichloropropionic acid	4
Dicyclopentadiene	30
Diethanolamine	8
Diethylamine	7
Diethylbenzene	32
Diethylene glycol	40
Diethylene glycol monobutyl ether	40
Diethylene glycol monobutyl ether acetate	34
Diethylene glycol monoethyl ether	40
Diethylene glycol monomethyl ether	40
Diethylenetriamine	7
Diethylethanolamine	8
Diethyl sulphate	34

Name	*Group No*
Diethylene glycol monophenyl ether	40
Diethyl ether	41
Diglycidyl ether of bisphenol A	41
Diheptyl phthalate	34
Diisobutylene	30
Diisobutyl carbinol	20
Diisobutyl ketone	18
Diisodecyl phthalate	34
Diisononyl phthalate	34
Diisooctyl phthalate	34
Diisopropanolamine	8
Diisopropylamine	7
Diisopropyl benzene	32
Diisopropyl naphthalene	32
Dimethyl acetamide	10
Dimethylamine	7
Dimethylcyclohexylamine	7
Dimethylethanolamine	8
Dimethylformamide	10
Dimethyl phthalate	34
Dimethyl polysiloxane	34
2,2- Dimethylpropane-1,3- diol	20
Dinonyl phthalate	34
Dioctyl phthalate	34
1,4- Dioxane	41
Dipentene	30
Diphenyl – diphenyl oxide	33
Diphenylmethane diisocyanate	12
Di-n-propylamine	7
Dipropylene glycol	40
Dipropylene glycol dibenzoate	34
Dipropyl ether	41
Diundecyl phthalate	34
Dodecane	31
Dodecanol	20
Dodecene	30
Dodecylamine, tetradecylamine mixture	7
Dodecylbenzene	32
Dodecyl diphenyl oxide disulphonate solution	43
Dodecyl pentadecyl methacrylate	14
Epichlorohydrin	17
Epoxy resin	18
Ethane	31
Ethanol	20
Ethanolamine	8
Ethoxylate alcohols C_{11} -C_{15}	20
Ethoxy triglycol	40
Ethyl acetate	34
Ethyl acrylate (inhibited)	14
Ethylamine	7
Ethyl benzene	32
Ethyl butanol	20
Ethylbutylamine (n-)	7
Ethyl chloride	36
Ethylene	30
Ethylene chlorohydrin	20
Ethylene cyanohydrin	20
Ethylenediamine	7
Ethylene dibromide	36
Ethylene dichloride	36
Ethylene glycol	20
Ethylene glycol monobutyl ether	40
Ethylene glycol monobutyl ether acetate	34
Ethylene glycol monoethyl ether	40
Ethylene glycol monoethyl ether acetate	34
Ethylene glycol monomethyl ether	40

Name	*Group No*
Ethylene glycol monoisopropyl ether	40
Ethylene glycol phenyl ether	40
Ethylene oxide	*
Ethylhexaldehyde	19
2-Ethyl hexanol	20
2-Ethylhexoic acid	4
2-Ethylhexyl acrylate (inhibited)	14
Ethyl hexylamine	7
Ethyl hexyl tallate	34
Ethylidene norbornene	30
Ethyl methacrylate (inhibited)	14
Ethyl methyl ketone	18
2-Ethyl-6-methyl-N-(1-methyl-2-methoxy ethyl) aniline	9
2-Ethyl-3-propyl acrolein	19
Fatty acid amides	33
Fluosilicic acid	1
Formaldehyde, methanol mixtures	19
Formaldehyde solution (37-50%)	19
Formic acid	4
Furfural	19
Furfuryl alcohol	20
Gas oil, cracked	33
Glutaraldehyde solution	19
Glycerine	20
Glyceryl triacetate	34
Glycidyl ester of versatic acid	34
Glycol diacetate	34
Glycols, resins and solvents mixture	33
Glyoxal solution	19
Grease and grease oil (animal fats and oils)	34
Heptane	31
Heptanoic acid (n-)	4
1-Heptene	30
Hexamethyleneimine	7
Hexane	31
Hexanol	20
Hexene	30
Hexylene glycol	20
Hydrochloric acid	1
Hydrofluoric acid	1
Isobutyl heptyl ketone	18
Isophorone	18
Isoprene (inhibited)	30
Isopropenylbenzene	30
Isopropylbenzene	32
Jet fuels:	
JP-1 (kerosene)	33
JP-3	33
JP-4	33
JP-5 (kerosene, heavy)	33
Kaolin clay slurry	43
Kerosene	33
Latex, liquid synthetic	43
Lignin liquor (calcium lignosulphonate, water solution)	43
Magnesium nonyl phenol sulphide	33
Maleic anhydride copolymer	33
Mesityl oxide	18
Methacrylic acid	4

Name	*Group No*
Methane	31
Methanol	20
Methoxy triglycol	40
Methyl acetate	34
Methyl acetoacetate	34
Methyl acetylene, propadiene mixture (stabilized)	30
Methyl acrylate (inhibited)	14
Methylamine	7
Methylamine solutions (52% or less)	7
Methyl amyl acetate	34
Methyl bromide	36
Methyl isobutyl carbinol	20
Methyl chloride	36
Methyl cyanide (acetonitrile)	37
2-Methyl-6-ethyl aniline	9
2-Methyl-5-ethyl pyridine	9
Methyl formal (dimethyl formal)	41
Methyl heptyl ketone	18
5-Methylhexan-2-one	18
2-Methyl-2-hydroxy-3-butyne	20
Methyl isobutyl ketone	18
Methyl isobutyl carbinol	20
Methyl methacrylate (inhibited)	14
Methyl naphthalene	32
Methylolureas (20% free formaldehyde)	19
Methyl pyrrolidone (n-)	9
Methyl tert-butyl ether	41
Mineral spirits	33
Molasses	20
Morpholine	7
Motor fuel antiknock compounds containing lead alkyls	*
Naphtha:	
coal tar	33
solvent	33
stoddard solvent	33
varnish markers' and painters' (75%)	33
Naphthalene (molten)	32
Naphthenic acid	4
Nitric acid (70% or less)	3
Nitric acid (95%)	*
Nitrobenzene	42
1- or 2- Nitropropane	42
Nitrotoluene	42
Nonane	31
Nonene	30
Nonyl alcohol	20
Nonyl phenol	21
Nonyl phenol (ethoxylated)	40
Nony phenol sulphide (90%)	33
Octadecene-1	30
Octadecenoamide (Oleamide)	10
Octane	31
Octene	30
Octyl alcohol	20
Octyl aldehyde	19
Octyl epoxytallate	34
Oils:	
clarified	33
coal oil	33
crude oil	33
diesel oil	33
residual	33
road	33
transformer	33

Name	*Group No*
Fuel oils:	
No 1 (Kerosene)	33
No 1-D	33
No 2	33
No 2-D	33
No 4	33
No 5	33
No 6	33
Edible oils, including:	
babassu	34
castor	34
coconut	34
coconut, methyl ester	34
corn	34
cotton seed	34
cotton seed fatty acid	34
fish	34
lard	34
olive	34
palm	34
peanut	34
Edible oils, including:	
rapeseed	34
rice bran	34
safflower	34
soybean	34
soybean, epoxidised	40
sunflower seed	34
tucum	34
vegetable	34
Miscellaneous oils, including:	
absorption	33
aliphatic	33
aromatic	33
coal tar	33
heartcut distillate	33
linseed	33
lubricating	33
mineral	33
mineral seal	33
motor	33
neatsfoot	33
oilicia	34
penetrating	33
range	33
resin	33
resinous petroleum	33
rosin	33
seal	34
soapstock	34
sperm	33
spindle	33
spray	33
tall	34
tall, fatty acid	34
tanner's	33
tung	34
turbine	33
white (mineral)	33
oleic acid	4
Pentachloroethane	36
Pentadecanol	20
1,3-Pentadiene	30
Pentane	31
3-Pentenenitrile (crude)	37
Pentyl aldehyde	19

Name	*Group No*
Petrol	33
Petrolatum	33
Petroleum crude oil	33
Petroleum distillates	33
Petroleum fuel n.o.s.	33
Petroleum naphtha	33
Petroleum spirit	33
Phenol	21
Phosphoric acid	1
Phosphorus	*
Phthalates, mixed	34
Phthalic anhydride (molten)	11
Picolines	9
Pinene	30
Polybutene	30
Polyethylene amines	7
Polyethylene glycols	40
Polymethylene polyphenyl-isocyanate	12
Polypropylene	30
Polypropylene glycol methyl ether	40
Polypropylene glycols	40
Polyvinylbenzyltrimethyl ammonium chloride solution	43
Potassium hydroxide solution	5
Propane	31
Propanol	20
Propanolamine	8
Propionaldehyde	19
Propionic acid	4
Propionic anhydride	11
Propyl acetate	34
Propylamine	7
Propylene	30
Propylene butylene polymer	30
Propylene dichloride	36
Propylene glycol	20
Propylene oxide	16
Propylene tetramer	30
Pseudocumene	32
Pyridine	9
Rum	20
Sewage sludge	43
Sodium borohydride solution (13% or less)	5
Sodium carbonate solutions	5
Sodium dimethyl naphthalene sulphonate.aq. solution	34
Sodium hydrosulphide solution (45% or less)	5
Sodium hydroxide solution	5
Sodium polyacrylate solution	43
Sodium silicate solution	43
Sorbitol	20
Stearic acid	4
Styrene (inhibited)	30
Sulpholane	39
Sulphur (molten)	*
Sulphuric acid	2
Sulphuric acid, fuming	*
Sulphuric acid, spent	2
Tallow	34
Tallow fatty acid	34
Tallow fatty alcohol	20
Tallow nitrile	37
1,1,2,2-Tetrachloroethane	
Tetrachloroethylene	36
Tetradecanol	20
Tetradecene	30
Tetradecylbenzene	32
Tetraethylene glycol	40
Tetraethylenepentamine	7
Tetrahydrofuran	41
Tetrahydronaphthalene	32
Tetrasodium salt of EDTA solution	43
Toluene	32
Toluenediamine	9
Toluene diisocyanate	12
Toluidine (ortho-)	9
Triarylphosphate	34
Tributyl phosphate	34
1,2,4-Trichlorobenzene	36
1,1,1-Trichloroethane	36
1,1,2-Trichloro-1,2,2-trifluoroethane	36
Trichloroethylene	36
Tridecane	34
Tridecanol	20
Tridecene	30
Tridecylbenzene	32
Triethanolamine	8
Triethylamine	7
Triethyl benzene	32
Triethyl phosphate	34
Triethylene glycol	40
Triethylenetetramine	7
Triisoctyl trimellitate	34
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate	34
2,2,4-Trimethyl-3-pentanol-1-isobutyrate	34
Tripropylene	30
Tripropylene glycol	40
Turpentine	30
Undecanol	20
Undecene	30
Undecylbenzene	32
Valeraldehyde	19
Vinyl acetate (inhibited)	13
Vinyl acetate, fumarate copolymer	34
Vinyl chloride (inhibited)	35
Vinylidene chloride (inhibited)	35
Vinyl neodecanate	13
Vinyl toluene (inhibited)	30
Xylene	32
Zinc bromide, calcium bromide solution	43

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* Because of very high reactivity or unusual conditions of carriage, this product is not included in the compatibility chart.

Cargo compatibility

Cargo groups \ Reactive groups	*1 Non-oxidising mineral acids*	*2 Sulphuric acid*	*3 Nitric acid*	*4 Organic acids*	*5 Caustics*	*6 Ammonia*	*7 Aliphatic amines*	*8 Alkanolamines*	*9 Aromatic amines*	*10 Amides*	*11 Organic anhydrides*	*12 Isocyanates*	*13 Vinyl acetate*	*14 Acrylates*	*15 Substituted allyls*	*16 Alkylene oxides*	*17 Epichlorohydrin*	*18 Ketones*	*19 Aldehydes*	*20 Alcohols, glycols*	*21 Phenols, cresols*	*22 Caprolactam solution*	
1 Non-oxidising mineral acids		X			X	X	X	X	X	X	X	X	X			X	X		A	E			1
2 Sulphuric acid	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2
3 Nitric acid		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		3
4 Organic acids		X			X	X	X	X	C			X				X	X			F			4
5 Caustics	X	X	X	X							X	X			X	X	X		X	X	X	X	5
6 Ammonia	X	X	X	X						X	X	X	X			X	X		X				6
7 Aliphatic amines	X	X	X	X							X	X	X	X	X	X	X	X	X	X	X	X	7
8 Alkanolamines	X	X	X	X							X	X	X	X	X	X	X	B	X				8
9 Aromatic amines	X	X	X	C							X	X							X				9
10 Amides	X	X	X			X						X									X		10
11 Organic anhydrides	X	X	X		X	X	X	X	X														11
12 Isocyanates	X	X	X	X	X	X	X	X	X	X					D				K	X		X	12
13 Vinyl acetate	X	X	X			X	X	X															13
14 Acrylates		X	X				X	X															14
15 Substituted allyls		X	X		X		X	X				D											15
16 Alkylene oxides	X	X	X	X	X	X	X	X															16
17 Epichlorohydrin	X	X	X	X	X	X	X	X															17
18 Ketones		X	X				X	B															18
19 Aldehydes	A	X	X		X	X	X	X	X			K											19
20 Alcohols, glycols	E	X	X	F	X		X					X											20
21 Phenols, cresols		X	X		X		X			X													21
22 Caprolactam solution		X			X		X					X											22
30 Olefins	J	X	X		J	J	J																30
31 Paraffins																							31
32 Aromatic hydrocarbons			X																				32
33 Miscellaneous hydrocarbon mixtures			X																				33
34 Esters		X	X		G														M				34
35 Vinyl halides			X																			X	35
36 Halogenated hydrocarbons					H		I																36
37 Nitriles		X																					37
38 Carbon disulphide							X	X															38
39 Sulpholane																							39
40 Glycol ethers		X										X											40
41 Ethers	L	X	X																				41
42 Nitrocompounds					X	X	X	X	X														42
43 Miscellaneous water solutions		X	N		O							X											43

Note: X Indicates not considered compatible.
A blank indicates the two are considered compatible. A letter other than X indicates a deviation. See Part 4.

Part 4 Reactivity differences (deviations) within chemical groups

A	Acrolein (19), crotonaldehyde (19), and 2-ethyl – 3-propyl acrolein (19) are not compatible with group 1, non-oxidising mineral acids.
B	Isophorone (18), and mesityl oxide (18) are not compatible with group 8, alkanolamines.
C	Acrylic acid (4) is not compatible with group 9, aromatic amines.
D	Allyl alcohol (15) is not compatible with group 12, isocyanates.
E	Furfuryl alcohol (20) is not compatible with group 1, non-oxidising mineral acids.
F	Furfuryl alcohol (20) is not compatible with group 4, organic acids.
G	Tallow fatty acid (34) is not compatible with group 5, caustics.
H	Trichloroethylene (36) is not compatible with group 5, caustics.
I	Ethylenediamine (7) is not compatible with ethylene dichloride (36).
J	Ethylidene norbornene (30) is not compatible with groups 1, 5-8.
K	Formaldehyde/methanol mixtures (19) are not compatible with group 12, isocyanates.
L	Methyl tert-butyl ether (41) is not compatible with group 1, non-oxidising mineral acids.
M	Sodium dimethyl naphthalene sulphonate, aqueous solution (34) is not compatible with formaldehyde (19).
N	Sodium polyacrylate solution (43) is not compatible with group 3, nitric acid.
O	Sodium silicate solution (43) is not compatible with group 5, caustics.

Part 5 List of substances by chemical groups

1 *Non-oxidising mineral acids*

Fluosilicic acid
Hydrochloric acid
Hydrofluoric acid
Phosphoric acid

2 *Sulphuric acids*

Spent sulphuric acid
Sulphuric acid (98% or less)

3 *Nitric acid*

Nitric acid (70% or less)

4 *Organic acids*

Acetic acid
Acrylic acid (inhibited)
Butyric acid
Cashew nut shell oil (untreated)
2,2-Dichloropropionic acid
2-Ethylhexoic acid
Formic acid
Heptanoic acid (n-)
Methacrylic acid
Naphthenic acid
Oleic acid
Propionic acid
Stearic acid

5 *Caustics*

Cresylate spent caustic solution
Potassium hydroxide solution
Sodium borohydride solution (13% or less)
Sodium carbonate solutions
Sodium hydrosulphide solution (45% or less)
Sodium hydroxide solution

6 *Ammonia*

Ammonia, anhydrous
Ammonium hydroxide (28% or less)
Ammonium hydroxide, ammonium phosphate, mollasses and water mixture
Ammonium nitrate, urea, water solutions (containing ammonia)

7 *Aliphatic amines*

Butylamine
Cyclohexylamine
Dibutylamine
Diethylamine
Diethylenetriamine
Diisopropylamine
Dimethylamine
Dimethylcyclohexylamine
Di-n-propylamine
Dodecylamine, tetradecylamine mixture
Ethylamine
Ethylbutylamine (n-)
Ethylenediamine
Ethyl hexylamine
Hexamethyleneimine
Methylamine
Methylamine solutions (52% or less)
Morpholine
Polyethylene amine
Propylamine
Tetraethylenepentamine
Triethylamine
Triethylenetetramine

8 *Alkanolamines*

2-(2-Aminoethoxy) ethanol
Aminoethylethanolamine
Diethanolamine
Diethylethanolamine
Diisopropanolamine
Dimethylethanolamine
Ethanolamine
Propanolamine
Triethanolamine

9 *Aromatic amines*

Aniline
2-Ethyl-6-methyl-N-(1-methyl-2-methoxy ethyl) aniline
2-Methyl-6-ethyl aniline
2-Methyl-5-ethylpyridine
Methyl pyrrolidone (n-)
Picolines
Pyridine
Toluenediamine
Toluidine (ortho-)

10 *Amides*

Acrylamide solution (50% or less)
Dimethyl acetamide
Dimethylformamide
Octadecenoamide (oleamide)

11 *Organic anhydrides*

Acetic anhydride
Phthalic anydride
Propionic anhydride

12 *Isocyanates*

Diphenylmethane diisocyanate
Polyphenyl polymethyleneisocyanate
Toluene diisocyanate

13 *Vinyl acetate*

Vinyl acetate (inhibited)
Vinyl neodecanate

14 *Acrylates*

Butyl acrylate (inhibited)
Butyl methacrylate (inhibited)
Butyl methacrylate, decyl methacrylate, cetyl eicosyl methacrylate mixture
Decyl acrylate (inhibited)
Dodecyl pentadecyl methacrylate
Ethyl acrylate (inhibited)
2-Ethylhexyl acrylate (inhibited)
Ethyl methacrylate (inhibited)
Methyl acrylate (inhibited)
Methyl methacrylate (inhibited)

15 *Substituted allyls*

Acrylonitrile (inhibited)
Allyl alcohol
Allyl chloride
Dichloropropane/1,3-dichloropropene mixture
1,3-Dichloropropene

16 *Alkylene oxides*

Propylene oxide
Butylene oxide

17 *Epichlorohydrin*

Epichlorohydrin

18 *Ketones*

Acetone
Acetophenone
Camphor oil
Cyclohexanone
Diisobutyl ketone
Epoxy resin
Ethyl methyl ketone
Isobutyl heptyl ketone
Isophorone
Mesityl oxide
5-Methylhexan-2-one
Methyl isobutyl ketone
Methyl heptyl ketone

19 *Aldehydes*

Acetaldehyde
Acrolein (inhibited)
Butyraldehyde
Crotonaldehyde
Decaldehyde
Ethylhexaldehyde
2-Ethyl-3-propyl acrolein
Formaldehyde
Formaldehyde, methanol mixtures
Furfural
Glutaraldehyde solution
Glyoxal solution
Methylolureas (20% free formaldehyde)
Octyl aldehyde
Pentyl aldehyde
Propionaldehyde
Valeraldehyde

20 *Alcohols, glycols*

Alcohols (mixed)
Amyl alcohol
Behenyl alcohol
Butanols
1,3-Butylene glycol
Choline chloride solutions
Cyclohexanol
Decyl alcohol
Diacetone alcohol
Diisobutyl carbinol
2,2-Dimethylpropane-1-3-diol
Dodecanol
Ethanol
Ethoxylated alcohols C_{11}-C_{15}
Furfuryl alcohol
Ethylbutanol
Ethylene chlorohydrin
Ethylene cyanohydrin
Ethylene glycol
2-Ethyl hexanol
Glycerin
Hexanol
Hexylene glycol
Methanol
2-Methyl-2-hydroxy-3-butyne
Methylisobutyl carbinol
Molasses
Octyl alcohol
Nonyl alcohol
Pentadecanol
Propanol
Propylene glycol
Rum
Sorbitol
Tallow fatty alcohol
Tetradecanol
Tridecanol
Undecanol

21 *Phenols and cresols*

Carbolic oil
Creosote, coal tar
Cresols
Cresylic acid
2,4-Dichlorophenol
Nonyl phenol
Phenol

22 *Caprolactam solution*

Caprolactam solution

23–29 *Unassigned*

30 *Olefins*

n-Amylene
n-Amylene/miscellaneous hydrocarbon mixture
Butadiene (inhibited)
Butylene
Cyclopentadiene polymers
Cyclopentadiene, styrene, benzene mixture
Decene
Dicyclopentadiene
Diisobutylene
Dipentene
Dodecene
Ethylene
Ethylidene norbornene
1-Heptene
Hexene
Isoprene (inhibited)
Isopropenylbenzene
Methyl acetylene, propadiene mixture (stabilized)
Nonene
Octadecene-1
Octene
1,3-Pentadiene
Pinene
Polybutene
Polypropylene
Propylene
Propylene butylene polymer
Propylene tetramer
Styrene (inhibited)
Vinyl toluene (inhibited)
Tetradecene
Tridecene
Tripropylene
Turpentine
Undecene

31 *Paraffins*

Butane
Cycloaliphatic resins
Cyclohexane
Decane
Dodecane
Ethane
Heptane
Hexane
Methane
Nonane
Octane
Pentane
Propane

32 *Aromatic hydrocarbons*

Benzene
Benzene, toluene, xylene (crude)
Cymene
Decylbenzene
Diethylbenzene
Diisopropyl benzene
Diisopropyl naphthalene
Dodecylbenzene
Ethylbenzene
Isopropylbenzene
Methyl naphthalene
Naphthalene
Pseudocumene
Tetradecylbenzene
Tetrahydronaphthalene
Toluene
Tridecylbenzene
Triethylbenzene
Undecylbenzene
Xylene

33 *Miscellaneous hydrocarbon mixtures*

Asphalt
Carbon black base
Diphenyl – diphenyl oxide
Fatty acide amides
Gas oil, cracked
Glycols, resins and solvents mixture
Jet fuels
Kerosene
Magnesium nonyl phenol sulphide
Mineral spirits
Naphtha
Naphtha, varnish makers' and painters' (75%)
Nonyl phenol sulphide (90%)
Oils, aliphatic
Oils, clarified
Oils, crude
Oils, diesel
Oils, coal
Oils, fuel (No 1 – No 6)
Oils, miscellaneous
Oils, residual
Oils, road
Oils, transformer
Oils, white (mineral)
Petrol
Petrolatum
Petroleum crude oil
Petroleum distillates
Petroleum fuel n.o.s.
Petroleum naphtha
Petroleum spirit

34 *Esters*

Acetyl tributyl citrate
Alkyl phthalates (n-)
Amyl acetate
Amyl tallate
Babassu oil
Butyl acetate
Butyl benzyl phthalate
Castor oil
Coconut oil
Coconut oil methyl ester
Corn oil
Cottonseed oil
Cottonseed oil fatty acid
Dibutyl phthalate
Diethylene glycol monobutyl ether acetate
Diethyl sulphate
Diheptyl phthalate
Diisodecyl phthalate
Diisononyl phthalate
Diisooctyl phthalate
Dimethyl phthalate
Dimethyl polysiloxane
Dinonyl phthalate
Dioctyl phthalate
Dipropylene glycol dibenzoate
Diundecyl phthalate
Ethyl acetate
Ethylene glycol monobutyl ether acetate
Ethylene glycol monoethyl ether acetate
Ethylhexyl tallate
Fish oil
Glyceryl triacetate
Glycidyl ester of versatic acid
Glycol diacetate
Grease and grease oil (animal fats and oils)
Lard
Methyl acetate
Methyl acetoacetate
Methyl amyl acetate
Octyl epoxy tallate
Oiticia oil
Olive oil
Palm oil
Peanut oil
Phthalates, mixed
Propyl acetate
Rapeseed oil
Rice bean oil
Safflower oil
Seal oil
Soapstock oil
Sodium dimethyl naphthalene sulphonate aq. solution
Soybean oil
Sunflower seed oil
Tall oil fatty acid
Tallow
Tallow fatty acid
Triarylphosphate
Tributyl phosphate
Tridecane
Triethyl phosphate
Triisoctyl trimellitate
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate
2,2,4-Trimethyl-3-pentanol-1-isobutyrate
Tucum oil
Tung oil
Vegetable oil
Vinyl acetate, fumarate copolymer

35 *Vinyl halides*

Vinyl chloride (inhibited)
Vinylidene chloride (inhibited)

36 *Halogenated hydrocarbons*

Carbon tetrachloride
Chlorobenzene
Chloridifluoromethane
Chloroform
Chlorotoluene (m-, o-, p-)
Dichlorobenzene
Dichloroisopropyl ether
Dichlorodifluoromethane
1,1-Dichloroethane
Dichloromethane
1,1-Dichloropropane
Ethyl chloride
Ethylene dibromide
Ethylene dichloride
Methyl bromide
Methyl chloride
Pentachloroethane
Propylene dichloride
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
Trichloroethylene
1,1,2-Trichloro-1,2,2,-trifluoroethane

37 *Nitriles*

Adiponitrile
Methyl cyanide (acetonitrile)
3-Pentenenitrile (crude)
Tallow nitrile

38 *Carbon disulphide*

39 *Sulpholane*

40 *Glycol ethers*

Diethylene glycol
Diethylene glycol monobutyl ether
Diethylene glycol monoethyl ether
Diethylene glycol monomethyl ether
Diethylene glycol monophenyl ether
Dipropylene glycol
Ethoxy triglycol
Ethylene glycol monobutyl ether
Ethylene glycol monoethyl ether
Ethylene glycol monoisopropyl ether
Ethylene glycol monomethyl ether
Ethylene glycol phenyl ether
Methoxy triglycol
Nonylphenol, ethoxylated
Polyethylene glycols
Polypropylene glycols
Polypropylene glycol methyl ether
Soybean oil, epoxidized
Tetraethylene glycol
Triethylene glycol
Tripropylene glycol

41 *Ethers*

Dibutyl ethers
Dichloroethyl ether
Diethyl ethers
Diglycidyl ether of bisphenol A
1,4-Dioxane
Dipropyl ether
Methyl tert-butyl ether
Methyl formal (dimethyl formal)
Propyl ether
Tetrahydrofuran

42 *Nitrocompounds*

2-Chloronitrobenzene
(mono-) Nitrobenzene
1- or 2-Nitropropane
Nitrotoluene

43 *Miscellaneous water solutions*

Ammonium nitrate, urea, water solutions (not containing ammonia)
Calcium bromide solution
Calcium chloride solutions
Corn syrup
Dextrose solution
Diammonium salt of zinc ethylene diamine tetraacetic acid solution
Dodecyl diphenyl oxide disulphonate solution
Kaolin clay slurry
Latex solutions
Lignin liquor (calcium lignosulphonate, water solution)
Polyvinylbenzyltrimethyl ammonium chloride solution
Sewage sludge
Sodium polyacrylate solution
Sodium silicate solution
Tetrasodium salt of EDTA solution
Zinc bromide, calcium bromide solution